

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Kent Sieffert (Reg. # 41,312) on 10/20/2008.

Examiner's NOTE: In regards to claims 28-39, it states "network elements comprising: an interface...a control unit...wherein the control unit computes...". Examiner interpreted network elements being hardware rather than software per se in view of the specification of the current application, as it is stated in paragraph 27, that "network device may be any in which traffic analysis and reporting functionality is integrated such as a router, hub, gateway, switch and the like". This means that network element is hardware since router, hub, gateway and switches are hardware.

In regards with claims 39-40, it states "network device comprising: an interface, a control unit, an accounting service card....". Examiner interpreted network device being hardware rather than software per se in view of the specification of the current application, as it is stated in paragraph 27, that "network device may be any in which traffic analysis and reporting functionality is integrated such as a router, hub, gateway, switch and the like". This means that network device is hardware since router, hub, gateway and switches are hardware

The application has been amended as follows:

In the Claims

Please **AMEND** claims 1,12,13,15,21,28,39,40 have been replaced with the following amended claims:

Claim 1 (Currently Amended) A method comprising:

calculating traffic statistics associated with packet flows through a network;

storing the traffic statistics within a flow table;

maintaining a heap that provides a heap-ordered representation of at least a portion of the traffic statistics of the packet flows within the flow table, wherein the heap is a tree having a root node and a plurality of other nodes arranged as parent nodes and child nodes, each of the nodes storing traffic statistics for a different one of the packet flows, and wherein the tree is heap-ordered in that a value for the traffic statistics stored in any child node of the tree is less than or equal to a value for the traffic statistics stored ~~for its~~ within that child node's parent node within the tree;

receiving a query from a client;

processing the heap in response to the query to select one or more of the nodes of the tree while continuing to update the traffic flow statistics in the flow table in response to network traffic; and

outputting the traffic statistics associated with the selected nodes of the tree to the client.

~~processing the heap to select one or more of the packet flows; and~~

~~outputting the traffic statistics associated with the selected packet flows.~~

Claim 2 (Cancelled)

Claim 12 (Currently Amended) The method of claim 1, ~~further comprising:~~
wherein receiving a query comprises receiving from a network client, wherein the
a query requests M ordered packet flows;
wherein processing the heap comprises cloning the heap to produce a heap
clone in response to the query and performing M-1 heapify operations to extract the M
ordered packet flow identifiers from the heap; and
wherein outputting the traffic statistics comprises outputting the traffic statistics
associated with the M packet flow identifiers.

Claim 13 (Currently Amended) A method comprising:
calculating traffic statistics associated with packet flows through a network;
storing the traffic statistics within a flow table;
maintaining a heap that provides a heap-ordered representation of the packet
flows within a network based on at least one criteria associated with the packet flows,
the heap-ordered representation of packet flows comprising [[is]] a tree having a root
node and a plurality of other nodes arranged as parent nodes and child nodes, each of
the nodes storing traffic statistics for a different one of the packet flows, and wherein a
value for the traffic statistics stored in any child node is less than or equal to a value for
the traffic statistics stored for its parent node within the tree; and
receiving a query from a client;
processing the heap in response to the query to select one or more of the nodes
of the tree while continuing to update the traffic flow statistics in the flow table in
response to network traffic; and
outputting the traffic statistics associated with the selected nodes of the tree to
the client.
~~processing the heap to output traffic statistics associated with an ordered subset~~
~~of the packet flows.~~

Claim 15 (Currently Amended) The method of claim 13, wherein processing the heap and outputting the traffic statistics comprises:

~~receiving a query from a network client;~~

cloning the heap to produce a heap clone in response to receiving the query from the client;

extracting one or more heap entries from the heap clone to extract identifiers for the ordered subset of the packet flows; and

outputting the traffic statistics associated with the extracted identifiers.

Claim 17–20 (Cancelled)

Claim 21 (Currently Amended) A computer-readable medium comprising instructions for causing a programmable processor to:

calculate traffic statistics associated with packet flows through a network;

store the traffic statistics within a flow table;

maintain a heap that provides a heap-ordered representation of at least a portion of the traffic statistics of the packet flows within the flow table, wherein the heap is a tree having a root node and a plurality of other nodes arranged as parent nodes and child nodes, each of the nodes storing traffic statistics for a different one of the packet flows, and wherein the tree is heap-ordered in that a value for the traffic statistics stored in any child node of the tree is less than or equal to a value for the traffic statistics stored for its parent node within the tree;

receive a query from a client;

process the heap in response to the query to select one or more of the nodes of the tree while updating the traffic statistics in a flow table in response to network traffic;
and

output the traffic statistics associated with the selected nodes of the tree to the client.

~~process the heap to select one or more of the packet flows; and~~

~~output the traffic statistics associated with the selected packet flows.~~

Claim 22 (Cancelled)

Claim 28 (Currently Amended) Network elements comprising:

[[an]] a network interface to receive packets flows from a network; and
a user interface to receive a query from a client; and
a control unit coupled to the network interface,
wherein the control unit computes flow statistics for the packets; and maintains
identifiers for the packet flows in a heap-ordered representation based on at least one of
the statistics,

wherein the heap-ordered representation is a tree having a root node and a
plurality of other nodes arranged as parent nodes and child nodes, each of the nodes
storing traffic statistics for a different one of the packet flows, and wherein the tree is
heap-ordered in that a value for the traffic statistics stored in any child node of the tree
is less than or equal to a value for the traffic statistics stored for its ~~within that child~~
~~node's~~ parent node within the tree,

wherein the control unit processes the heap to select one or more of the
identifiers in response to receiving the query from the client, and

wherein the user interface outputs a portion of the traffic statistics associated with
the selected identifiers.

Claim 30 (Cancelled)

Claim 39 (Currently Amended) A network device comprising:

an interface to receive packets flows from a network;
a control unit coupled to the interface; ~~and~~
an accounting service card comprising a flow table to store flow statistics,
wherein the control unit forwards the packets to the accounting service card to calculate
the traffic statistics, wherein the accounting service card computes the flow statistics for
the packets, and maintains ~~maintaining~~ a heap that provides a heap-ordered
representation of the packet flows within the flow table, wherein the heap is a tree
having a root node and a plurality of other nodes arranged as parent nodes and child
nodes, each of the nodes storing traffic statistics for a different one of the packet flows,

and wherein the tree is heap-ordered in that a value for the traffic statistics stored in any child node of the tree is less than or equal to a value for the traffic statistics stored for its parent node within the tree; and

a user interface to receive a query from a client,

wherein the accounting service card is configured to process the heap in response to the query to select one or more nodes of the tree while continuing to update the traffic flow statistics in the flow table in response to network traffic, and

wherein the user interface is configured to output the traffic statistics associated with the selected nodes of the tree to the client.

Claim 40 (Currently Amended) The network device of claim 39, wherein the accounting service card further comprises:

~~a flow table to store the flow statistics; and~~

a heap table to store the heap.

Allowable Subject Matter

Claims 1,3-16,21,23-27,28-29,31-40 respectively are allowed. Claims 2,17-20,22,30 are cancelled. Claims 1,3-16,21,23-27,28-29,31-40 respectively are renumbered as claims 1,2-15,16,17-21,22-23,24-33 respectively.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance: "maintaining a heap that provides a heap-ordered representation of at least a portion of the traffic statistics of the packet flows within the flow table, wherein the heap is a tree having a root node and a plurality of other nodes arranged as parent nodes and child nodes, each of the nodes storing traffic statistics for a different one of the packet flows, and wherein the tree is heap-ordered in that a value for the traffic statistics stored in any child node of the tree is less than or equal to a value for the traffic statistics stored for its parent node within the tree".

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dhairya A. Patel whose telephone number is 571-272-5809. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, first Fridays OFF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on 571-272-3964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/John Follansbee/ SPE 2451